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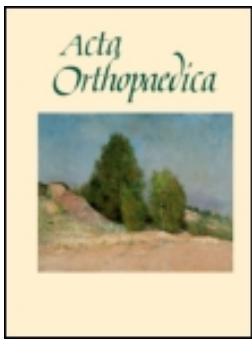
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Secondary synovial chondromatosis in a bursa overlying an osteochondroma mimicking a peripheral chondrosarcoma—a case report

Costantino Errani¹, Paul C Jutte², Massimiliano De Paolis¹, Patrizia Bacchini¹, and Mario Mercuri¹

¹Musculoskeletal Oncology Department, Istituto Ortopedico Rizzoli, Bologna, Italy, ²University Medical Centre, Groningen, the Netherlands.

Correspondence CE: le12316@iperbole.bologna.it

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A 47-year-old woman presented with pain in the left groin lasting 4 months, without any trauma. A solitary osteochondroma of the proximal left femur had been diagnosed radiographically 19 years earlier (Figure 1). A hard, tender mass could be palpated in the proximal medial part of the left thigh. The mass was fixed to the bone, but the overlying skin was mobile. No enlarged lymph nodes were palpable in the left groin. There was no neurovascular compromise of the left lower limb and the laboratory tests were unremarkable.

Plain radiographs of the left hip showed a changed appearance of the exostosis compared to 19 years earlier. There was an extensive ossified

mass with multiple peripheral calcifications (Figure 2). A Technetium-99m HDP bone scan revealed increased uptake at the site of the osteochondroma. MRI showed continuity of the osteochondroma with the lesser trochanter; it was unclear whether there was a continuity between the exostosis and the overlying mass. It was difficult to assess the thickness of the cartilage cap. There was a clear demarcation between the cartilage and the adjacent soft tissues that were not involved (Figure 3). The differential diagnosis included peripheral chondrosarcoma and secondary synovial chondromatosis (SC). CT confirmed cortical and medullary continuity of the exostosis with the underlying bone,



Figure 1. Radiograph 19 years prior to presentation, showing a solitary osteochondroma of the proximal left femur.



Figure 2. Anteroposterior radiograph 19 years after the image in Figure 1, suggestive of soft tissue mass containing multiple peripheral calcifications with ill-defined margins.

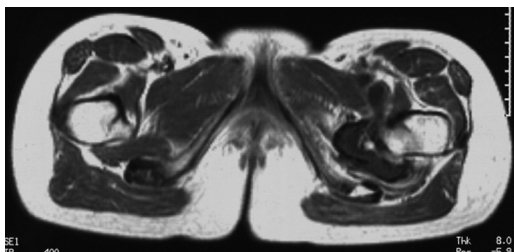


Figure 3a. Axial T1-weighted MRI showing continuity of the osteochondroma with the lesser trochanter. In contrast to the CT image in Figure 4, MRI does not show clear distinction between the exostosis and the overlying mass. The demarcation between mass and the surrounding tissue is sharp.



Figure 3b. Sagittal T2-weighted, fat-suppressed contrast-enhanced MRI demonstrating high signal intensity at the periphery of the mass and intermediate signal intensity centrally. There is a clear demarcation between mass and the surrounding soft tissues.

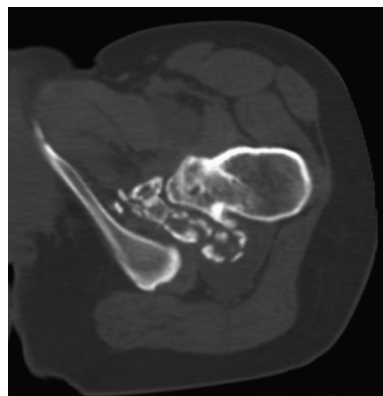


Figure 4. Axial CT scan for bone: showing cortical and medullary continuity of the exostosis with the underlying bone. A well-defined lobulated mass with numerous calcifications is seen without erosion of bone.



Figure 5. Operative photograph of excised osteochondroma showing numerous loose bodies.

and showed a lobulated well-defined mass with numerous calcifications surrounding the osteochondroma (Figure 4).

Trochar biopsy was inconclusive due to an insufficient quantity of material. An incisional biopsy showed numerous multiple cartilaginous nodules (Figure 5). Histology showed a synovial-like tissue with nodules composed of benign hyaline cartilage (Figure 6). The diagnosis was SC arising in the bursa overlying an osteochondroma. Excision of the mass and the underlying osteochondroma was performed. The cartilaginous nodules were totally contained within the bursal sac and not adherent to the exostosis. Final histological analysis confirmed

the benign cartilaginous metaplasia without evidence of malignant features.

There was no relapse at the final follow-up, 8 years after the excision.

Discussion

The clinical and radiographic features mimicked malignant degeneration of an osteochondroma with development of a peripheral chondrosarcoma. Bursa formation overlying an osteochondroma is a well-known phenomenon, especially in large osteochondromas or in places where there is fric-

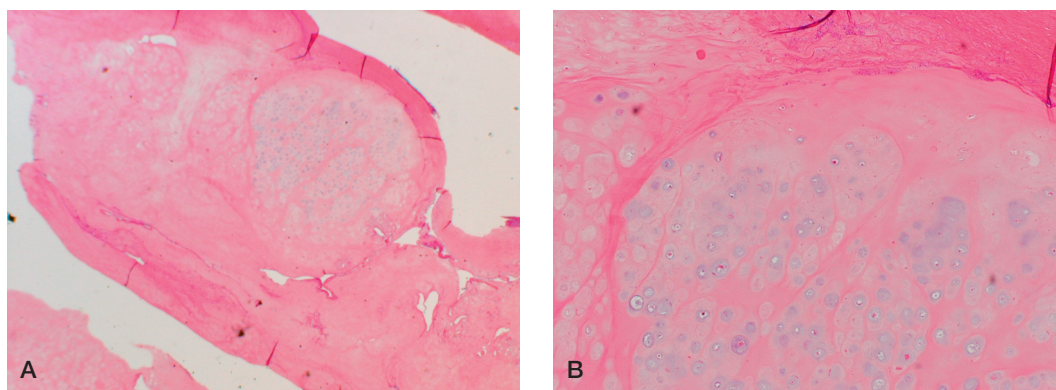


Figure 6. Low-power (A) and medium-power (B) photomicrographs showing the synovial chondromatosis. There is cartilaginous metaplasia within the synovial membrane. The cartilage shows evidence of proliferative activity, with large pleomorphic nuclei. These tend to be arranged in small bunches.

tion between the osteochondroma and overlying tissue, such as the trochanteric or scapulothoracic area (Murphy et al. 1962, El-Khoury and Bassett 1978, Borges et al. 1981, Griffiths et al. 1991).

Malignant transformation occurs in less than 1% of solitary osteochondromas (Garrison et al. 1982, Campanacci 1999). However, the arising of a secondary SC within a bursa overlying an osteochondroma may be still more uncommon; we have found reports of only 7 cases (El-Khoury and Bassett 1978, Borges et al. 1981, Schofield et al. 1994, Wright et al. 1997, Peh et al. 1999). In the secondary SC, the loose bodies are within the joint and have the potential for slow growth by synovial metaplasia following proliferation of surrounding connective tissue (Milgram 1977, Villacin et al. 1979, Saotome et al. 1999). Exceptional cases with a transformation from SC to chondrosarcoma have been described (Kaiser et al. 1980, Perry et al. 1988, Bertoni et al. 1991, Kenan et al. 1993, Hermann et al. 1997, Wuisman et al. 1997, Wittkop et al. 2002, Ko et al. 2004).

Diagnosis based on clinical findings and imaging may be difficult because SC can mimic a peripheral chondrosarcoma in terms of symptoms and interpretation of radiographs and MRI (El-Khoury and Bassett 1978, Kenan et al. 1993, Schofield et al. 1994). The slow course, prolonged over a number of years, may be equally slow in low-grade chondrosarcoma. In our case, the presence of a pre-existing exostosis indicated the possibility of malignant degeneration in peripheral chondrosarcoma (Campanacci 1999). Radiographs are not specific, show-

ing only a cartilaginous mineralization in the soft tissue mass in both entities (Sim et al. 1977). Bone scintigraphy is not very helpful either, demonstrating slightly increased uptake in both (Zwas et al. 1988). MRI is usually very reliable in anatomical delineation, and may satisfactorily show the clear margin between the calcified mass and the underlying cartilage cap. However, the images of the bursa with its nodules and fluid may mimic a thick cartilage cap as seen in peripheral chondrosarcoma, and so there are no specific MRI features to distinguish SC from chondrosarcoma (Wittkop et al. 2002). CT may be more helpful, showing the lobulated pattern of the calcified nodules lying separately from the exostosis (El-Khoury and Bassett 1978). Post-contrast axial CT scan may show a fluid-filled bursa containing numerous dense loose bodies (Schofield et al. 1994). Favoring SC, Peh et al. (1999) demonstrated very well how a shift of the cartilaginous nodules can be seen if the patient is examined in prone and supine position. Furthermore, CT can show the aspect of skeletal marginal/superficial erosions and suggest that this occurred due to compression from the outside. These aspects indicate the diagnosis of SC (Campanacci 1999, Wittkop et al. 2002).

Histological examination of biopsy material from a secondary SC may easily lead to overdiagnosis of chondrosarcoma, because of the borderline distinction between benign cartilaginous lesions and low-grade chondrosarcoma (Kaiser et al. 1980). The cytological aspects are often the same as those observed in a grade 1 chondrosarcoma (Villacin et

al. 1979, Borges et al. 1981, Campanacci 1999). In case of an abnormal appearance of a calcified mass overlying an osteochondroma, the diagnosis will most frequently be peripheral chondrosarcoma, but one should consider the possibility of a secondary SC in an overlying bursa. Careful interpretation of imaging techniques is necessary and should include a CT scan.

Contributions of authors

CE and PCJ: wrote the manuscript. MM, CE, and MDP: performed the surgery. PB: performed the diagnosis.

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